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ABSTRACT

A computer teacher in a middle school in East Tennessee observed that his students were entering the middle school program with computer familiarity but without the touch keyboarding skills necessary to operate the computer efficiently. It was also observed that even with instruction and practice using drill and practice keyboarding software, the students were not successful at breaking their bad keyboarding habits. This study looked at the effects of teaching the keyboarding skills in four different methods. The researcher worked with four middle school classes. One class received touch keyboarding instruction using drill and practice keyboarding software, "KeyWords Elementary." The second class received touch keyboarding instruction using "Type To Learn," a drill and practice keyboarding software that incorporates typing games for motivation. Another class used the "KeyWords" software with a hand cover that blocked their view of the keyboard as they practiced. The last group used the hand covers with "Type To Learn." All classes received two days of introductory lessons to familiarize them with the proper touch keyboarding technique. After two days, a series of one minute timed typing tests were given. The best three of the four tests were used to calculate an average typing score for each student. After nine hours of instruction, the same four tests were given again to determine an average typing speed. The pretest score was subtracted from the posttest score to obtain a measurement of the increased typing speed. A statistical analysis was performed on the collected data. The analysis showed that there is a significant gain in typing speed when the student uses a hand cover while using the "Type To Learn" software. The study concludes that the best way to retrain middle school students to touch keyboard correctly is to use a hand cover and drill and practice keyboarding software package that incorporates typing games for motivation. Appendices include tabulated results; hand cover design instructions; color-coded keyboard chart; student worksheets; typing tests; and permission letter and form for study participants. (Contains 33 references.) (Author/AEF)

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INCREASING TOUCH-KEYBOARDING SKILLS IN THE MIDDLE SCHOOL STUDENT:

KeyWords vs. Type to Learn, Hand Covers vs. No Hand Covers

An Action Research Project
Presented to
the Department of Teacher Education
of Johnson Bible College

In Partial Fulfillment
of the Requirement for the Degree
Master of Arts in
Educational Technology and Bible

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APPROVAL PAGE

This Research Project by Steven Dallas Reagan is accepted in its present form by the Department of Teacher Education at Johnson Bible College as satisfying the research paper requirements for the degree Master of Arts in Educational Technology and Bible.

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A computer teacher in a middle school in East Tennessee observed that his students were entering the middle school program with computer familiarity but without the touch keyboarding skills necessary to operate the computer efficiently. It was also observed that even with instruction and practice using drill and practice keyboarding software, the students were not being successful at breaking their old, bad keyboarding habits. This study looked at the effects of teaching the keyboarding skill in four different methods.

The researcher worked with four middle school computer classes. One class received touch keyboarding instruction using drill and practice keyboarding software, KeyWords Elementary. The second class received touch keyboarding instruction using Type to Learn , a drill and practice keyboarding software that incorporated typing games for motivation. Another class used the KeyWords software with a hand cover that blocked their view of the keyboard as they practiced their touch keyboarding skills. The last group also used the hand covers but with the Type to Learn software.

All classes received two days of introductory lessons to familiarize them with the proper touch keyboarding technique. After two days a series of one minute timed typing tests were given. The best three of the four tests were used to calculate an average typing score for each student. After nine hours of instruction, the same four tests were given again to determine an average typing speed. The pretest score was subtracted from the posttest score to obtain a measurement of the increased typing speed.

A statistical analysis was preformed on the collected data. The analysis showed that there is a significant gain in typing speed when the student uses a hand cover while using the Type to Learn software. The study concludes that the best way to retrain middle school students to touch keyboard correctly is to use a hand cover and a drill and practice keyboarding software package that incorporates typing games for motivation.

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Chapter 1

INTRODUCTION

Significance of the Problem

By the time students enter the middle schools years (grades 6 –8), most of them have had the opportunity to work with a computer. Some students show more familiarity with the computer than do others, and thus have developed several computer skills. However, one skill that shows to be lacking in almost every student is touch-keyboarding or correct keyboarding techniques. The absence of this skill causes the student's use of a computer to be inefficient. Teachers have reported that the time it takes a non-keyboarding student to complete a task using the computer becomes a problem, especially when there is a limited number of computers for their class to use. Research also shows that the inability to touch-keyboard can add to the student's anxiety toward using the computer. In order to avoid these problems and to better utilize the limited number of computers in schools, students need to be taught the touch-keyboarding skill.

Statement of the Problem

Many of today's middle school students use the "hunt and peck" one-finger method when using a computer. Students, who have had the benefit of a computer in their home, tend to have developed their own keyboarding technique using two fingers and sometimes up to four fingers are utilized. These keyboarding methods are a hindrance in using a computer efficiently. They also give students a false sense that "they know how to keyboard." As more and more households acquire computers and more elementary classrooms are equipped with computers, the self-styled keyboarding student is becoming

the majority group now seen in the middle school, computer skills, classroom. The question becomes, What is the best way, as judged by typing speed and accuracy, to re-teach students to use the keyboard utilizing the touch-keyboarding method?

In the past, this researcher has taught keyboarding skills by using a drill and practice typing software package by Humanities Software called KeyWords Elementary. Students are encouraged not to look at their hands as they learn the touch-keyboarding method. The students start off working very well with the software. However after a few days they begin to get frustrated. As a result they start to go back to their old keyboarding habits. This is especially true for the "experienced" typist. It becomes necessary for the instructor to stand over the student to make sure they are practicing correctly. Of course it is impossible to watch over everyone at the same time. As soon as the student thinks the teacher isn't looking, she/he will go back to their old keyboarding methods.

This research was an attempted to determine if the keyboarding software's lack of "typing games" or the lack of utilizing hand covers during keyboarding practice can cause a problem when re-teaching students to use the keyboard correctly. A comparison was made between two keyboarding software titles. One was the KeyWords program mentioned earlier. The other software package was one that offered drill and practice lessons along with "typing games" to motivate the student. The software used was Type to Learn by Sunburst Communications Company. The keyboarding practice method was changed so that some students were required to use a hand cover so that they were not able to see the keys as they learned to touch-keyboard. A comparison was made of each

group's test results to see if any group's increase in touch-keyboarding speed was significantly higher than any other group of students.

Definition of Terms

Home Position The letters ASDF for the left hand, the letters JKL; for the right hand, and the space bar for the thumbs make up the home position where the typist's hands should be kept while using a keyboard.

Touch-keyboarding/correct keyboarding For the purpose of this study the correct keyboarding method or touch-keyboarding method is defined as keeping both hands in home position at the keyboard and then reaching with the correct finger to press a key.

Hand Cover For this study, the hand cover is a device that is made in such a way that it sits over the keyboard blocking the student's view of the keys. At the same time it allows the students to place their hands underneath it as they type on the keyboard. (See the hand cover design and picture in the appendix B page 46.)

Increased keyboarding skill In this study, an increase in keyboarding skill means that the speed in which the student typed the letters, after an adjustment for errors, went up.

Adjustment for errors For each error made the students typing speed was reduced by 0.5 words per minute. For example, a typing test score of 20 w.p.m. (word per minute) with 3 errors would be recorded as 18.5 w.p.m.

Limitations of the Study

This study was conducted in four computer skills classes in which the researcher was also the instructor. The classes of 25 to 30 pupils represented a varied student

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population. No attempt for randomization was made. Due to the fact that the teaching of other state curriculum objectives was required, the students were only able to use the keyboarding software for a total of 9 hours, (20 minutes a day for 27 days). A review of the literature has shown that there is no agreement as to how many hours the training requires. However, most of the latest research advocates that 25 to 30 hours are needed to effectively train middle school students in an introductory keyboarding class. According to some researchers, these hours can be spread out over three years with 10 hours of training in each year, or 15 hours in each of two years.

Assumptions

The following assumptions were made.

1. It was assumed that the exposure to keyboarding techniques, which the students received while in the sixth grade, and the time spent during this experiment were sufficient to adequately train for the touch-keyboarding skill.

2. It was assumed that the time of day had no effect on the results. (Two classes occurred in mid morning. The other two classes were at the end of the day.)

3. The assumption that all classes were equally motivated to succeed was made.

Null Hypotheses

All of the following hypotheses were tested using statistical analysis of the groups mean scores on pre and post computer scored typing tests.

1. Students receiving instruction without hand covers and the Type to Learn software will have no significant increase in typing speed over students who use no hand cover and the KeyWords software, at the .05 level of significance.

2. Students receiving instruction with the Type to Learn software while using a hand cover will have no significant increase in typing speed over students who use Type to Learn software without a hand cover, at the .05 level of significance.

3. Students receiving instruction with the KeyWords software while using a hand cover will have no significant increase in typing speed over students who use KeyWords software without a hand cover, at the .05 level of significance.

4. Students receiving instruction with the Type to Learn software while using a hand cover will have no significant increase in typing speed over students who use the KeyWords software with a hand cover, at the .05 level of significance.

5. Students receiving instruction with the KeyWords software and no hand cover will have no significant increase in typing speed over students who use the Type to Learn software while using a hand cover, at the .05 level of significance.

6. Students receiving instruction with the Type to Learn software and without hand covers will have no significant increase in typing speed over students who use the KeyWords software while using a hand cover, at the .05 level of significance.

Chapter 2

REVIEW OF RELATED LITERATURE

Why Should Keyboarding Be Taught?

A review of the literature shows that there was a furor of activity on the subject of teaching keyboarding during the mid to late 1980's. Of course this was the time that we began to see computers being bought and placed in the classrooms of the nation's schools. Before this time keyboarding classes were taught in high school and were known as typewriting classes. When the computer found its way into the elementary school setting, thoughts about keyboard instruction had to change.

"The increasing use of computers in business, industry, government, education and in the home has made the efficient use of computers a basic skill" (Russin, 1995, p. 1). Since the keyboard is the standard method used to enter data into a computer, students must be given an opportunity to use this tool of the information age effectively by developing basic fundamental keyboarding skills (Warwood, 1985, p. 2). If the computer is going to become a tool for the student, much like a pencil or pen is used as a tool, then the student needs to fully develop his/her keyboarding abilities.

> Because of the continuing increase in the use of computers in our personal, educational, and professional lives, good keyboarding skills are more important than ever. Despite technological advances in optical-character and voice recognition, the keyboard is, and will continue for some time to be, the most widely used input device in communicating with computer. Therefore, keyboarding can no longer be considered a secretarial skill. It is a basic communication skill needed by all individuals (Chang, 1995, p. 2).

When the student is at the keyboard, his/her thoughts should be directed toward the subject or problem they are working on, not on locating the keys of the keyboard.

"Frustration peaks as they (Students) lose their creative ideas while searching for the correct keys" (Binderup, 1988, p. 31). Hunt and peck typists are not able to concentrate on what they are inputting because all their attention must be focused on their fingers (Chang, 1995, p. 5). "Students who have adequate keyboarding skills use their time at the computer efficiently—that is, they can concentrate on problem solving or composing, rather than on the mechanics of typing" (Wetzel, 1985, p. 131). "Without adequate keyboarding skills, writing using computers is difficult and time consuming" (Goins, 1996, p. 96). In her report on keyboarding skills and computer anxiety, Mary Artwohl reported that familiarity with the keyboarding skill stimulates interest and enables concentration to be focused on the task to be accomplished, thus awareness and understanding about computers is increased and anxiety is decreased (Artwohl, 1989). Also, Wetzel wrote in his report…

> I watched student after frustrated student scan handwritten notes for the last word typed, and then look down for the key that represented the first letter of the next word, look up at the screen to verify the letter and correct letter position—and then lose the place. Fingers would point and eyes would search from paper to keyboard to screen and back to paper. The cycle continued and the frustration grew (Wetzel, 1985, p. 131).

A study of four fourth-grade classes at three schools further illustrates the benefits students can gain from keyboarding instruction. Bridget Dalton reported that two of the classes received touch-keyboarding instruction, while the other two received no training.

> Although students who received no direct instruction appeared fairly competent on the keyboard during the first few months of the project, when writing assignments were relatively short, their weak typing skills became evident during the latter part of the year when they began to write more extended pieces on the computer. Frustrated by their inability to type quickly and accurately, some students bemoaned the fact that it took so long to write on the computer—writing

> longhand in their theme books was a pleasant alternative since their fluency was unimpeded by their weak typing skills (Dalton, 1988).

Dalton went on to report that the two classes that had been given touch-keyboarding instruction were able to easily complete the assignments.

"Research does confirm that students who have become proficient in touch-keyboarding complete work faster and are more efficient in their use of the keyboard" (McEntee, 1994, p. 2). Obviously students will benefit greatly from keyboarding instruction. They will use their time more wisely. They will use school computer equipment effectively. But most importantly, teaching students to touch-keyboard lays the foundation for a vital lifelong skill (Boyce, 1992, p. 1).

When Should Keyboarding Be Taught?

After reading the literature looking for when keyboarding should be taught, I've found one thing that all the researchers can agree on, "the sooner the better." Some advocate that teaching keyboarding should start in kindergarten. Others say third grade, while still others say middle school is the best time to have formal keyboarding classes taught.

Starting keyboarding in kindergarten can be a problem. Students of this age have not yet fully developed their psychomotor skills. Keyboarding is a psychomotor skill. For a student to learn and perform keyboarding they must involve mental processes as well as finely coordinated muscular movements (Goins, 1996,p. 96). Kindergarten students are also just beginning to learn and recognize the alphabet. The searching over the keyboard to find a letter helps in the student's ability to recognize the letters of the alphabet. But a

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teacher should not expect the student to be able to keep his/her hand in a home row position and learn to type correctly.

Most researchers report that students should be taught to keyboard as soon as they are physically and intellectually ready, but there are conflicting ideas as to when this occurs. Some say that doesn't occur until ages 10 to 12 (Chang, 1995, p. 7). But it was shown by Rowe in 1958 that even 8 and 9 year old third and fourth graders could master the touch-keyboarding keyboarding skill (Erthal, 1985, p. 193).

Most of the research seems to point to the third or fourth grade as the earliest time to initially introduce the student to keyboarding. In grades K-2, software used today tends to use short one-letter answers in response to a tutorial's questions. (For example a "Y" for "yes" and a "N" for "no" are used.) As students move into the third and higher grades, they are able to benefit from other computer applications like word processors. Thus keyboarding skills will become more and more important for the student to possess. "Third or fourth grade has become a common placement of formal keyboarding instruction. Research indicates that fourth-grade students are developmentally ready to master keyboarding" (McEntee, 1994, p. 2).

Some reports say that middle school is an ideal time for effective touch-keyboarding instruction, because students at this level can develop the touch-keyboarding skill in a relatively short time and can transfer this skill to language-based activities (Goins, 1996, p. 97). Most students have developed their finger dexterity and eye-hand coordination sufficiently to be able to succeed in learning the keyboard by the time he/she is in middle school (McEntee, 1994, p. 8). By the time a student is ready to enter the sixth

grade or middle school, it is essential that they be taught the correct keyboarding procedure. By the time they reach high school, keyboarding class is taught as an elective in most school systems. Since most of the "hunt and peck" students are already confident that they know how to type, they never consider their option of taking a keyboarding class. Thus, middle school may be the last opportunity for many students to be taught the correct touch-keyboarding skill.

Jackson also had this to say about when to introduce keyboarding to students:

> In early elementary (K-2), the goal of instruction may simply be to aid students in locating keys on the keyboard. But beginning at about the third grade level, formal development of correct keyboarding technique should be introduced, focusing on the alphabetic keys. Third grade students are physiologically ready to learn keyboarding and studies have shown that they can become keyboard proficient. At the upper elementary level, number and symbol/function keys should be introduced along with a simple-to-use text editor/word processor (Jackson, 1986, p. 8).

Both Jackson and Warwood (1985) agree that keyboarding should be taught just prior to the student's required use of the keyboard for text entry such as using a word processor. "Whenever possible, touch-keyboarding instruction should be presented before students are assigned other computer-related activities" (Maxam, 1993, p. 242).

In summary to the question: When is it best to teach touch-keyboarding? —The researcher found that many articles reported ideas that would be in agreement with most of the following suggestion:

> Students should become aware of the keyboarding process as soon as they are asked to input information into the computer. Students should learn the correct position of their fingers on the keys and the correct posture as they learn the computer. If this learning process takes place in the elementary school, a keyboarding awareness should be taught. However, a formal keyboarding course

> should be delayed until the students have matured in their finger dexterity and eye-head coordination (McEntee, 1994, p. 7).

How Should Keyboarding Be Taught?

Should keyboarding be taught by a teacher using a textbook or by a computer running keyboarding software? Research has shown that in the acquisition of touch-keyboarding skills there is no significant difference between student's success in learning when compared to being taught by a teacher or when taught by software tutorial (Ruvsin, 1995, p. 18). Since both methods appear to be equally effective, using keyboarding software should be the method of choice because doing so frees the teacher to do other things such as monitor more closely each student to make sure he/she uses the proper keyboarding technique. It also allows the teacher to give more individual attention to the students. Teachers would not be able to meet these challenges without the many features of today's software (Olinzock, 1998, p26). Olenzock provides the following list of what most of today's software can do:

- Analyze the present skill level of the individual learner.
- Identify weaknesses in an individual's keyboard skill (technique, not errors) at the present skill level hindering the individual from progressing to a higher skill level.
- Electronically generate structured individualized materials designed to improve various technique deficiencies (not keyboarding errors) impeding an individual's progress to a higher skill level.
- Generate technique and motivational prompts to assist the individual in achieving higher skill levels.
- Guide and motivate the individual through technique presentations, practice, and feedback.
- Reward students for achieving higher skill levels.
- Complement existing textbooks so that exercises from existing textbooks can be evaluated using features built into the skill building software.

- Provide feedback/records to students.
- Provide feedback/records for the teacher.

Regardless of the method selected, teacher or software, to teach students, "keyboarding should not be viewed as a subject, but rather as a skill that is useful for learning other subjects" (Kahn, 1990, p. 138). Researchers have reported a positive direct correlation between students who have received touch-keyboarding instruction and their success in other subject areas where computers are used in the curriculum.

There are differences in the achievement of students in introductory computer classes. These differences are based on three over lapping phases: (1) Cognitive phase: 0 to 17.9 words per minute; (2) Overlapping of cognitive and associative phases: 18 to 24.9 words per minute; and (3) Associative or autonomous phases: 25 words per minute (Maxam, 1993, p. 234). The goal of course is to get all students to the autonomous phase. Doing so will allow the student to focus all their cognitive mental energies on the task of the assignments, not on their interaction with the keys on the keyboard.

"The elementary keyboarding class should emphasize proper technique and accuracy rather than speed as a guideline for determining successful touch keyboarding skills" (Warwood, 1985, p. 45). Not all researchers agree on this point. Some advocate that the emphasis should be on speed first and then worry about developing accuracy later. However, this researcher's own experience, both personally and as a twelve year veteran keyboarding instructor, causes me to agree with Warwood and the majority of the research findings that support the view –accuracy first then speed with practice. If timed tests are used to determine students keyboarding speed, it is recommended that the time

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periods be kept very short, as short as 15 to 30 seconds. By doing so, the students will be encouraged to maintain their fingering technique while still pursuing an increase in speed (Kalm, 1991, p. 139).

Does using hand covers during keyboard practice benefit the students in any way? In a study with fourth graders using a keyboarding software program, Warwood reported on his findings about using a paper hand cover. He stated that some of his students practiced and were tested on their keyboarding skills as someone held a piece of paper over the keyboard, keeping the student from seeing the keyboard. Covering the keyboard "reinforced the students to touch keyboard more effectively" (Warwood, 1985, p.44). Binderup reported that holding a piece of cardboard or a manila folder between the typist's eyes and the computer keyboard would encourage students from the start to look at the monitor, not their hands on the keyboard, to see if the correct letter is being typed. She also suggested that color coded dots be placed on the tops of keys so that the letters were not visible. If these suggestions are followed the "hunt-and-peck disease" will be cured (Binderup, 1988, p.32).

Research also shows that it is important to follow-up keyboard instruction with opportunities for students to use their skill. This can be done with writing assignments from language arts, science, or social studies classes. "If students are taught correct procedures in a special keyboarding class and then return to the regular classroom to use computers, regular classroom teachers should be trained to monitor and reinforce proper techniques" (McEntee, 1994, p. 3). Betty Boyce had the following to say…

> ...Keyboarding skills improve little or abate without consistent reinforcement. Teachers at the grade level where keyboarding is introduced—and at all levels above, no matter what subject they teach—should be trained to provide reinforcement activities wherever computers or typewriters are used in the curriculum. Teaching students to keyboard, and then failing to provide adequate reinforcement and application opportunities is somewhat like teaching students to read and then not providing books, opportunity, or motivation for them to read afterwards (Boyce, 1992, p.7).

Teachers who do not insist on good keyboarding techniques are not helping their students; actually they are failing to give their students the best education they deserve (McEntee, 1994, p. 8).

How Long Should the Course Be?

The ideal length of a keyboarding course has been reported to be various lengths. Warwood (1985) and Milkes (1985) both reported similar times of approximately 32 sessions over an eight-week period in each of their studies. "After 15 hours of appropriate keyboarding instruction, students with instruction were judged to be approximately twice as fast as those who had no formal keyboarding instruction" (Jackson, 1986, p. 8). Fifth graders who were given keyboarding instruction for 40 minutes, every day, for nine weeks showed a gain in typing speed to an average 20 words per minute (Kercher, 1985, p. 5). Jackson (1986) also reported that they see 30 hours of instruction as crucial. He went on to offer a choice of how to get 30 hours of instruction into the curriculum: Fifteen hours of keyboarding instruction in each of two years of school, or ten hours in each of three years. Another opinion reported was: "The keyboard should be taught rapidly and logically. The entire keyboard (letters, numbers, and symbols) should be taught as rapidly as possible, in perhaps four weeks (May, 1997, p. 6).

The suggestions, as to what is the correct length for touch-keyboarding instruction time, were as numerous as the number of researchers who had suggestions to make. It was impossible to determine from the literature what was the absolute best length. However, most of the latest research advocated that 25 to 30 hours will be required to adequately retrain middle school students in developing the touch-keyboarding skill.

What Conclusions Can Be Reached?

Obviously the research points to the fact that the sooner the student is introduced to keyboarding the better for the student. With a few exceptions to the rule, keyboarding should not be introduced before the third grade. During the years K-2 the student should be told that the left hand and right hand are to press different keys on the keyboard. A good way to remind him/her of that fact is to place a piece of yarn down between the keys that border the left and right half of the keyboard. The yarn forms a border or wall that each hand is not to cross over, as the letter keys are typed (McEntee, 1994, p. 3).

The ideal situation would be to introduce and train the students in keyboarding before they ever use the computer for other applications. Of course this is not possible. The best we can do for our students is give them proper keyboard instruction starting as early as the third grade. Then give them keyboarding assignments at regular intervals through out their remaining school career to reinforce their keyboarding skills. Since our classrooms are not always ideal, it is extremely important that all students be taught the correct way to do touch-keyboarding before they leave middle school to enter high school. Unfortunately, many students are not receiving formalized instruction. "Students

are the people who suffer the consequences if an educational system fails to recognize this very vital need" (McEntee, 1994, p. 3).

Chapter 3

METHODS AND PROCEDURES

Subjects in the Study

The study involved four computer skills classes at a middle school in Eastern Tennessee. The general school population was a mixture of rural and urban students. Approximately 43% of the students qualify for free or reduced priced lunch under US federal government guidelines. The students ranged from 11 to 15 years of age. Each group or class had 25 to 30 students enrolled. The students were assigned to the class by their homeroom placement. Thus everyone in the group was a member of the same homeroom. Students were assigned to a homeroom with the intent to make the homeroom reflective of the diversity of the school population. As the school guidance counselors made the homeroom assignments they made every effort to be sure that minority, low and high academic achieving, and behavior problem students were equally divided among all homerooms. Thus no effort on the part of the researcher was made for randomization.

Study Timeline

Due to class scheduling, all groups attended computer classes during the fall semester of the 1999-2000 school year. All four groups attended a 45-minute computer skills class each day for twenty-seven days. During the first 20 minutes of each day's class, each student used keyboarding software to practice and strengthen their keyboarding skills.

Testing

At the beginning of each six-week period, each student participated in class exercises that allowed each individual student to identify the "home position" keys as well as the keys that each finger is assigned to press. (See appendix C, pages 49 and 50 for student worksheets.) After completion of the exercises each student was given a keyboarding pretest.

The pretest consisted of four short computer scored typing tests that measured the speed and accuracy of the students keyboarding skill. In order to determine a single numerical score for each of the four tests, one half point for each error was subtracted from the total number of words per minute that were typed. This resulted in each student having four test scores. The worst score was discarded, and the remaining three were averaged to create one numerical pretest score for each student.

The tests were administered with a hand cover over the keyboard so that the student could not look at his hands. Placed beside the computer were two items. (1) A paper copy of the words the student had to type during the test, (see appendix D, pages 52-55). (2) A paper with the graphic of a keyboard that had been color-coded to show the keys that each finger is responsible for pressing. (See the appendix B, page 47 for a copy of the chart)

At the end of the six-week practice period a posttest was administered. It was the same four short computer scored typing tests that were used for the pretest. Once again, in order to determine a single numerical score for each of the four tests, one half point for each error made was subtracted from the total number of words per minute that were

typed. The worst of the four scores were discarded, and the remaining three were averaged to create one numerical posttest score for each student. The keyboard was covered with a hand cover. The same color-coded chart of the keyboard and a copy of the testing document were placed next to the computer in view of the student.

Experimental Factor

The experimental factors in this study were: (1) Hand covers were used over the keyboard while two of the groups practiced keyboarding. (2) Keyboarding software that offers drill and practice plus "keyboarding games" as a motivational tool was used with two of the groups.

As previously mentioned, all four groups attended computer skills classes during the fall semester of the 1999-2000 school year. None of the four groups were told about what the other classes were doing.

Group A practiced their keyboarding skills by using the KeyWords software. They did not use the hand covers while they practiced; however they were encouraged not to look at their hands. If they did not know where a key was located, they were encouraged to look at the color-coded keyboard chart. Group A included every student in one of the four classes.

All the students in a second class made up Group B. They used the Type to Learn software as they practiced their keyboarding skills. Like Group A, they did not use a hand cover as they practiced. They too had the color-coded keyboard chart to look at as they tried not to look at their hands.

Group C used the KeyWords software and was required to use the hand covers as they practiced their keyboarding skills. They had the same color-coded keyboard chart placed next to their computer just as Groups A and B did. Group D used the same keyboard chart. They used the Type to Learn software to practice their keyboarding skills. Plus they too were required to use the hand cover as they practiced keyboarding.

Statistical Analysis

In order to determine the net gain in the keyboarding skill of each student group, each individual's pretest score average was subtracted from their posttest score average to determine the increase in the individuals keyboarding speed. In order to check the various hypotheses previously stated the following tests were made:

1—The mean increase in the keyboarding speed of Group A, KeyWords no hand covers, was compared to the mean increase in the keyboarding speed of Group B, Type to Learn no hand covers.

2—The mean increase in the keyboarding speed of Group B, Type to Learn no hand covers was compared to the mean increase in the keyboarding speed of Group D, Type to Learn with hand covers.

3—The mean increase in the keyboarding speed of Group A, KeyWords no hand covers, was compared to the mean increase in the keyboarding speed of Group C, KeyWords with hand covers.

4—The mean increase in the keyboarding speed of Group C, KeyWords with hand covers, was compared to the mean increase in the keyboarding speed of Group D, Type to Learn with hand covers.

5—The mean increase in the keyboarding speed of Group A, KeyWords no hand covers, was compared to the mean increase in the keyboarding speed of Group D, Type to Learn with hand covers.

6—The mean increase in the keyboarding speed of Group B, Type to Learn no hand covers was compared to the mean increase in the keyboarding speed of Group C, KeyWords with hand covers.

Chapter 4

RESULTS

Type to Learn no hand cover vs. KeyWords no hand cover

Null Hypothesis #1: Students receiving instruction without hand covers and the Type to Learn software will have no significant increase in typing speed over students who use no hand cover and the KeyWords software, at the .05 level of significance.

After group A and group B completed their 540 minutes of practice time and a posttest was administered, the researcher collected and compared the data. An analysis of the data showed the mean for group A, KeyWords software and no hand covers, was 4.45992, while the mean for group B, Type to Learn software and no hand covers, was 4.39104. (See Table 1 below.) The two-tailed t-test for Equality of Means was 0.948. Since this data indicated no statistical significance at the .05 level, the hypothesis was retained.

Table 1

Type to Learn no hand cover vs. KeyWords no hand cover

Groups	N	Means	Mean Difference	Std Error of Means	t-ratio	Sig. 2-tailed
KeyWords (no hand cover)	25	4.45992				
			0.06888	1.05337	0.065	0.948*
Type to Learn (no hand cover)	26	4.39104				

*Not Significant

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Type to Learn with hand cover vs. Type to Learn no hand cover

Null Hypothesis #2: Students receiving instruction with the Type to Learn software while using a hand cover will have no significant increase in typing speed over students who use Type to Learn software without a hand cover, at the .05 level of significance.

The analysis on data collected on group D, Type to Learn with hand covers, showed a mean of 8.66659. Like all other groups, group D completed 540 minutes of keyboard practice time. Data for group B, Type to Learn and no hand covers, showed a mean of 4.39104. Further analysis produced a mean difference of 4.27555 and standard error of means of 1.22137. (See Table 2 below.) The two-tailed t-test was .001. Since this figure shows significance at the .05 level, hypotheses number two is rejected.

Table 2

Type to Learn with hand cover vs. Type to Learn no hand cover

Groups	N	Means	Mean Difference	Std Error of Means	t-ratio	Sig. 2-tailed
Type to Learn (with hand cover)	22	8.66659				
			4.27555	1.22137	3.501	0.001*
Type to Learn (no hand cover)	26	4.39104				

* Significant

KeyWords with hand cover vs. KeyWords no hand cover

Null Hypothesis #3: Students receiving instruction with the KeyWords software while using a hand cover will have no significant increase in typing speed over students who use KeyWords software without a hand cover, at the .05 level of significance.

Group C, KeyWords with a hand cover during practice, data was collected after they completed 540 minutes of practice time. Their data was compared to data from group A, KeyWords no hand cover during practice. The data analysis showed a mean of 5.48410 for group C, while group A's mean was 4.45992. A mean difference of 1.02418 was computed, along with a standard error of means at 1.22169. The data also showed a t-ratio of 0.838. (See Table 3 below.) The two-tailed t-test for Equality of Means was 0.838. Since this data indicated no statistical significance at the .05 level, the hypothesis was retained.

Table 3

KeyWords with hand cover vs. KeyWords no hand cover

Groups	N	Means	Mean Difference	Std Error of Means	t-ratio	Sig. 2-tailed
KeyWords (with hand cover)	21	5.48410				
			1.02418	1.22169	0.838	0.406*
KeyWords (no hand cover)	25	4.45992				

*Not Significant

Type to Learn with hand cover vs. KeyWords with hand cover

Null Hypothesis #4: Students receiving instruction with the Type to Learn software while using a hand cover will have no significant increase in typing speed over students who use the KeyWords software with a hand cover, at the .05 level of significance.

The data collected for group C and group D were compared in a statistical analysis. The results showed that group C, KeyWords with a hand cover during practice time, had a mean of 5.48410. Group D, Type to Learn with a hand cover during practice, had a mean of 8.66659. A mean difference of 3.18250 and a standard error of means at 1.40879 were computed. The t-ratio was 2.259. The two-tailed t-test was .029. (See Table 4 below.) Since this figure shows significance at the .05 level, hypotheses number two is rejected.

Table 4

Type to Learn with hand cover vs. KeyWords with hand cover

Groups	N	Means	Mean Difference	Std Error of Means	t-ratio	Sig. 2-tailed
Type to Learn (with hand cover)	22	8.66659				
			3.18250	1.40879	2.259	0.029*
KeyWords (with hand cover)	21	5.48410				

* Significant

Key Words no hand cover vs. Type to Learn with hand cover

Null Hypothesis #5: Students receiving instruction with the Key Words software and no hand cover will have no significant increase in typing speed over students who use the Type to Learn software while using a hand cover, at the .05 level of significance.

Group A, Key Words without hand covers, showed a mean of 4.45992. Group D, Type to Learn with hand covers, had a mean score of 8.66659. The mean difference calculated to be 4.20667, and the standard error of means was 0.90403. The t-ratio was 4.653. (See Table 5 below.) At 0.000, the two-tailed t-test showed the data results to be very significant at the 0.05 level. Thus, hypothesis number 5 was rejected.

Table 5

Type to Learn with hand cover vs. Key Words no hand cover

Groups	N	Means	Mean Difference	Std Error of Means	t-ratio	Sig. 2-tailed
Type to Learn (with hand cover)	22	8.66659	4.20667	0.90403	4.653	0.000*
Key Words (no hand cover)	26	4.45992				

* Significant

Type to Learn no hand cover vs. Key Words with hand cover

Null Hypothesis #6: Students receiving instruction with the Type to Learn software and without hand covers will have no significant increase in typing speed over students who use the Key Words software while using a hand cover, at the .05 level of significance.

The data collected for group B, Type to Learn without hand covers during practice, showed a mean of 4.39104. Group C, Key Words with hand covers during practice, showed a mean of 5.48410. The data analysis showed a mean difference of 1.09306, a standard error of means of 1.47469, and a t-ratio of 0.741. With a two-tailed t-test score of 0.462, hypothesis number 6 is retained.

Table 6

Type to Learn no hand cover vs. Key Words with hand cover

Groups	N	Means	Mean Difference	Std Error of Means	t-ratio	Sig. 2-tailed
Key Words (with hand cover)	21	5.48410				
			1.09306	1.47469	0.741	0.462*
Type to Learn (no hand cover)	26	4.39104				

*Not Significant

Chapter 5

SUMMARY, CONCLUSION, RECOMMENDATIONS

Summary

The purpose of this study was to determine the best way to increase the touch-keyboarding skills of middle school aged students. The researcher tried to test the effectiveness of drill and practice software—KeyWords, compared to drill and practice with motivational typing games—Type to Learn. Another component of the research was to test the effectiveness of requiring students to use a device that blocked the view of their hands as they practiced touch-keyboarding.

Six null hypotheses were stated:

1. Students receiving instruction without hand covers and the Type to Learn software will have no significant increase in typing speed over students who use no hand cover and the KeyWords software, at the .05 level of significance.

2. Students receiving instruction with the Type to Learn software while using a hand cover will have no significant increase in typing speed over students who use Type to Learn software without a hand cover, at the .05 level of significance.

3. Students receiving instruction with the KeyWords software while using a hand cover will have no significant increase in typing speed over students who use KeyWords software without a hand cover, at the .05 level of significance.

4. Students receiving instruction with the Type to Learn software while using a hand cover will have no significant increase in typing speed over students who use the KeyWords software with a hand cover, at the .05 level of significance.

5. Students receiving instruction with the KeyWords software and no hand cover will have no significant increase in typing speed over students who use the Type to Learn software while using a hand cover, at the .05 level of significance.

6. Students receiving instruction with the Type to Learn software and without hand covers will have no significant increase in typing speed over students who use the KeyWords software while using a hand cover, at the .05 level of significance.

This research involved four different computer classes made up of eighth grade students. Each class contained twenty-one to twenty-six participating students. (The data for any students who were absent for three or more days was not used in the analysis.) All four classes received instruction and practice in touch-typing for twenty minutes a day over twenty-seven days. Thus, each student participated in nine hours of keyboarding skill development.

One class, group A, was required to use the KeyWords software and to practice without the aid or benefit of a hand cover. Another class, group B, was required to use the Type to Learn software, and they too were required to use the hand covers as they practiced each day. Group C was required to use the KeyWords software and kept the hand cover in place, blocking their view of their hands, as they practiced their touch-keyboarding skills. The fourth class, group D,

was required to use Type to Learn software and practice their touch-keyboarding while they kept a hand cover in place, blocking the view of their hands.

After two days of introductory exercises and worksheets, each student was given a keyboarding pretest. During the test each student was required to kept a hand cover in place to block their view of their hands. The pretest consisted of four one-minute timed typing tests. Each was given a score based on the number of words typed minus one half point for each error made. The worst score of the four was discarded, and an average score was calculated for the best three scorers. At the end of the twenty-seven day practice period, the same four timed tests were administered again as a posttest. The scoring was done the same way as the pretest. (See Figures 1, 2, 3, and 4 in the appendix A, pages 40-43.) The student's improvement score was calculated by subtracting the pretest and posttest scores. The improvement score was then used in a statistical analysis comparing the four classes.

Conclusions

After reviewing the statistical analysis, the researcher concluded that three of the null hypotheses should be retained and three of the hypotheses should be rejected. Those to be retained were numbers 1, 3, and 6. Numbers 2, 4, and 5 were rejected. In all three of the rejected hypotheses the two-tailed t-test showed a significance at the 0.05 level. Looking at the data analysis it becomes obvious that using Type to Learn with a hand cover produces a significant increase in touch-

keyboarding skills when compared to each of the other three student groups. (See Tables 2, 4, and 5 on pages 23, 25, and 26.)

The question arises, was the significant increase in touch-keyboarding skills due to the software, Type to Learn, or was it due to the use of the hand covers during practice? Looking at the data from the comparison of group A, KeyWords no hand covers, and group B, Type to Learn no hand covers, (See Table 1 on page 22.) you can see that Type to Learn doesn't show to be any better than KeyWords. In fact the mean score for Type to Learn is slightly lower than the mean of KeyWordsConsidering this fact, one would expect to see a significant increase in touch-typing by the group using KeyWords with hand covers over the group using KeyWords without hand covers. However that was not the case as can be seen in Table 3 on page 24. The hand cover group had a one point gain in the mean score, 5.48410, over the non-hand cover group's mean score, 4.45992. This gain, however, was not significant in the two-tailed t-test. The researcher made personal observations in the classes that may aid in developing an explanation for this phenomenon.

It was observed that the classes that used the Type to Learn software were motivated by the typing games. The other two classes that used KeyWords, soon tried of the program and complain often about the 20 minutes they had to practice each day. In the class that used KeyWords with hand covers, the researcher observed that the hand cover seemed to serve as a challenge for several but not all of the students. Thus, for those students, the use of the hand cover was almost as

motivating as the Type to Learn typing games were for the other groups of students.

The researcher also observed that students that used Type to Learn without hand covers seemed to be overly motivated by the typing games. In their eagerness to succeed at the games, they often lost focus of the goal to use proper touch-keyboarding techniques. They very often would revert back to their old way of incorrectly entering letters at the keyboard. The researcher feels this accounts for the dismal showing that the Type to Learn with no hand cover group had when compared to the KeyWords with no hand cover group. (See Table 1 on page 22.) On the other hand, the group of students that used Type to Learn with a hand cover seemed to concentrate more on learning the correct techniques so they could excel at playing the games.

In the final analysis, the research clearly shows that the best way to increase the touch-keyboarding skills for the middle school student is to use a hand cover with software that utilizes typing games as a motivational tool.

Recommendations

The researcher recommends the following for further research:

1. Replications of this study should be done in other classrooms with other subjects and comparisons should be made with the results of this study.
2. This study should be performed over a longer period of time with a larger population.
3. This study should be repeated with other middle school grade levels.

4. A study should be conducted to see if hand covers are a more efficient way to learn touch-keyboarding in the third, fourth, and fifth grade levels.
5. Additional software titles that use typing games and those that don't, should be compared to see if similar results occur.

Although we are beginning to see voice input directing our computers, the keyboard will continue to be the device used most often by humans to interact with these machines of the 21st century. That will make it necessary for us to train our young people touch-keyboard skills so they can use the computer more efficiently. As the computer is introduced to the classroom it is very important to train students how to correctly use the keyboard before they begin to develop their own inefficient keyboarding habits. If they should make it all the way to the middle school level without proper touch-keyboarding, then this research has shown the best way to retrain those students. We should use a software program that uses typing games as a motivational tool—such as Type to Learn—along with a hand cover to block the view of their hands as they practice.

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APPENDICES

APPENDIX A

Figure 1
Eye to Eye with head covers during practice

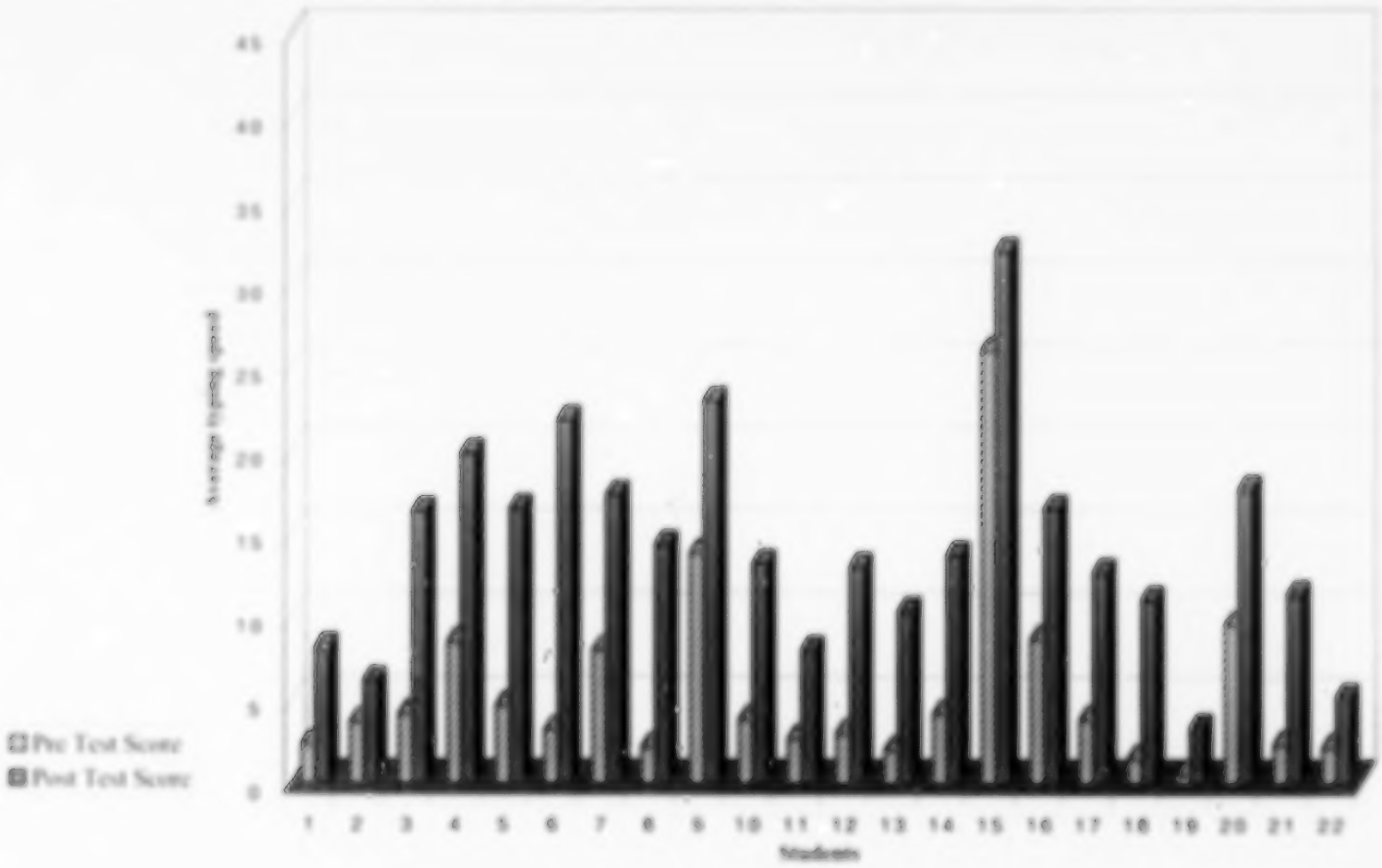


Figure 2
KeyWords with hand covers during practice

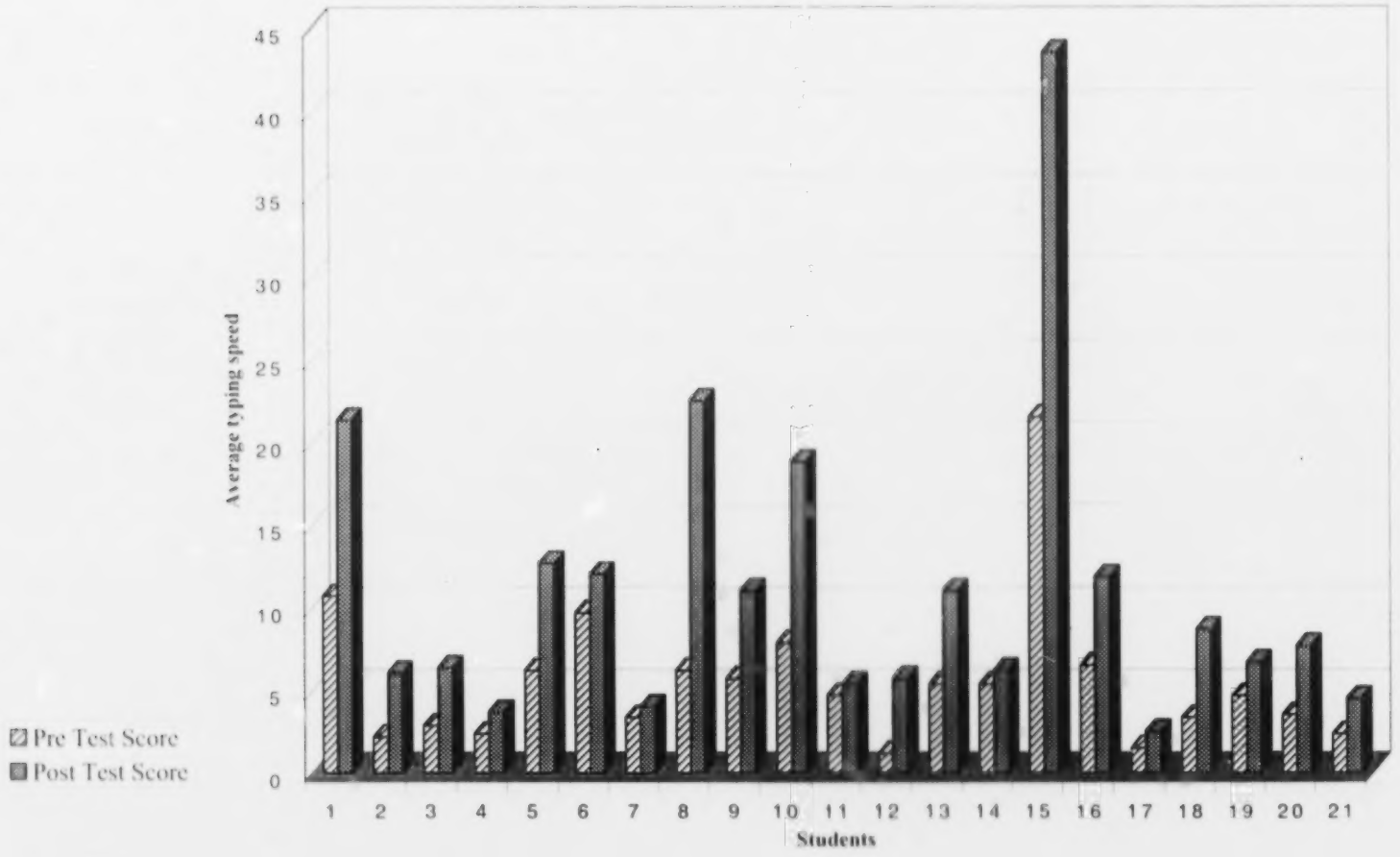


Figure 3
Type to Learn no hand covers during practice

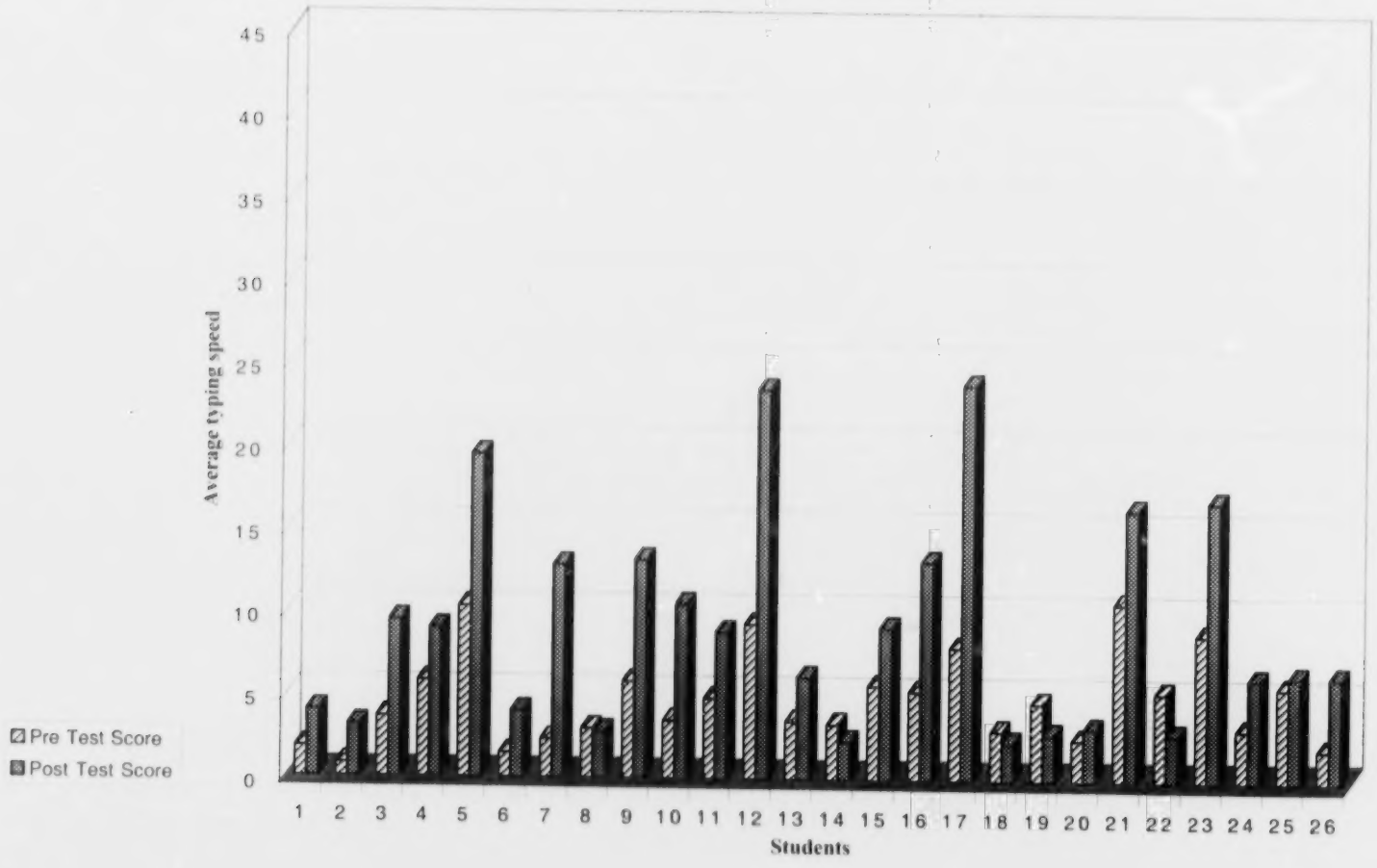
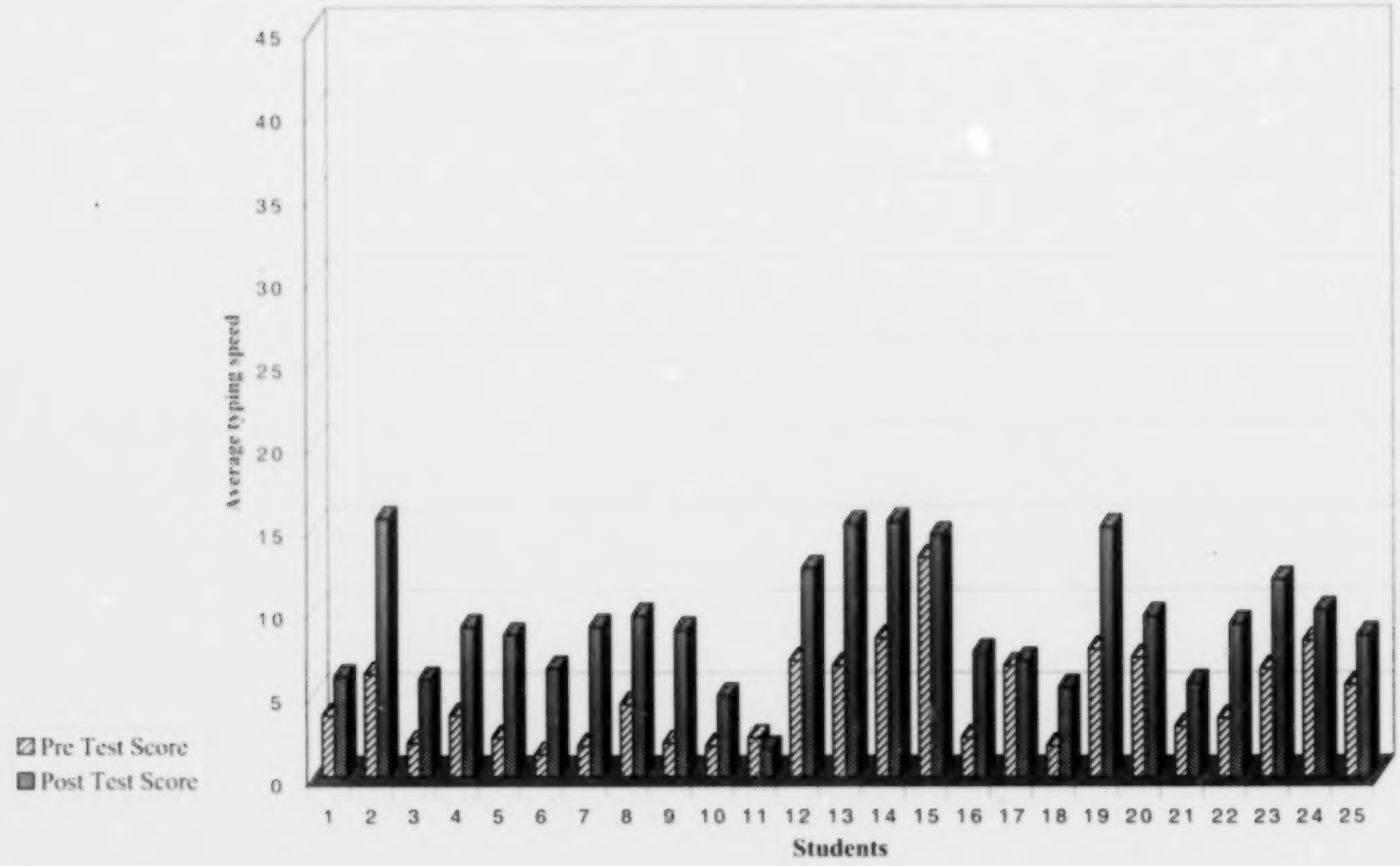
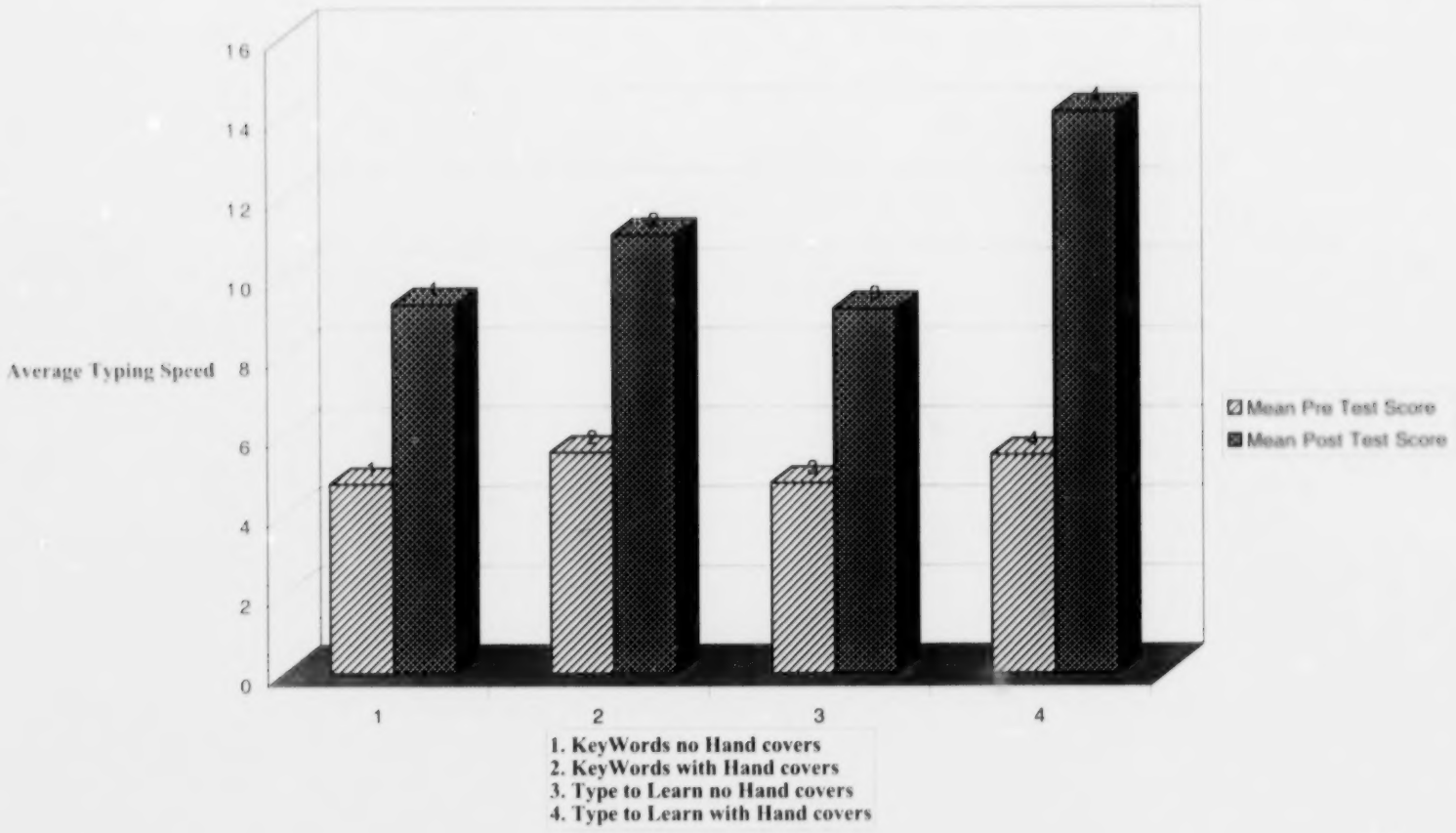


Figure 4
KeyWords no hand covers during practice




Pre & Post Test Means
Average Typing Speed
16
14
12
10
8
6
4
2
0
1
2
3
4
Mean Pre Test Score
Mean Post Test Score
1. KeyWords no Hand covers
2. KeyWords with Hand covers
3. Type to Learn no Hand covers
4. Type to Learn with Hand covers

APPENDIX B

Hand Cover Design

Materials list for constructing the typing hand covers

1/2 inch cpvc pipe need:

- 4 -- pipe segments cut to 5 inches
- 2 -- pipe segments cut to 19.5 inches
- 2 -- pipe segments cut to 4 inches
- 4 -- pipe segments cut to 1 inch

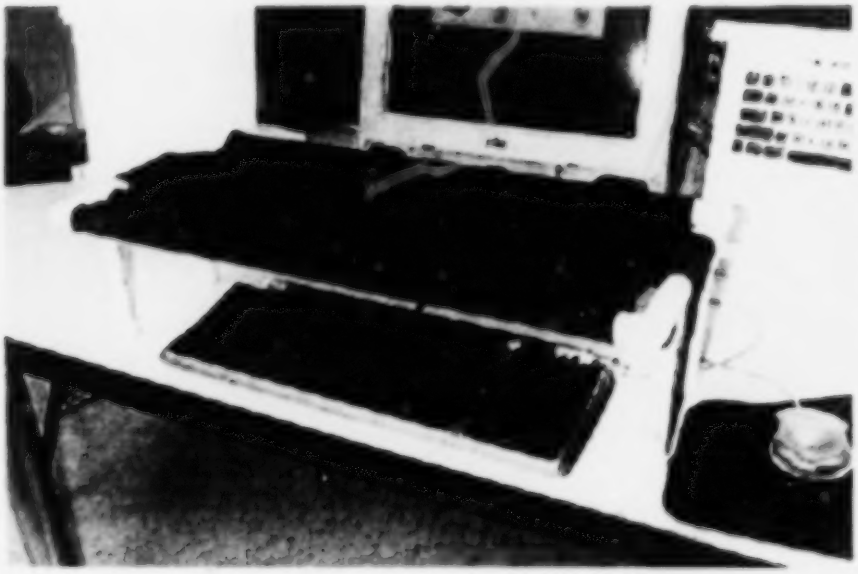
Total cpvc pipe needed is 71 inches or about 6 ft.

cpvc pipe joints needed

- 4 -- 90° elbows for 1/2 inch pipe
- 4 -- "T" joints for 1/2 inch pipe

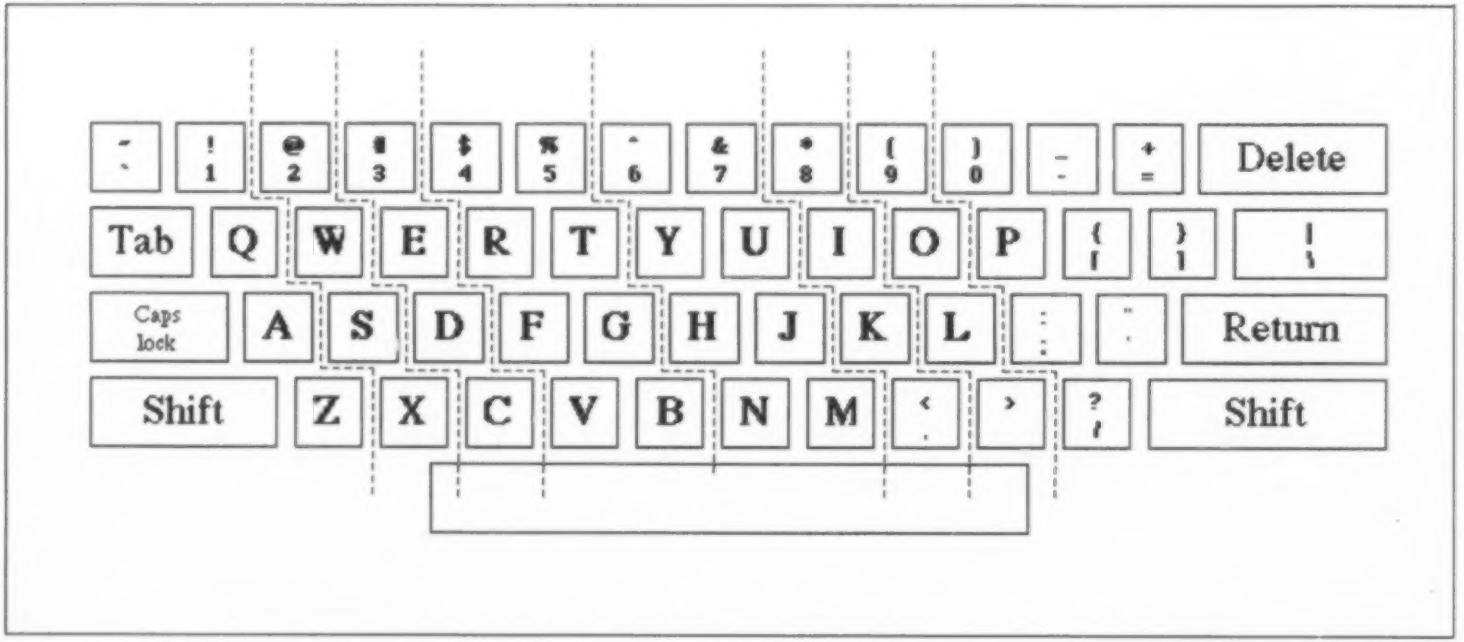
Other items needed

- 4 -- 1/2 pipe end caps (for feet at bottom of the legs)
- 1 – can of cpvc all purpose glue
- 1 – 22 inch by 9 inch square of felt



MACINTOSH KEYBOARD

APPENDIX C

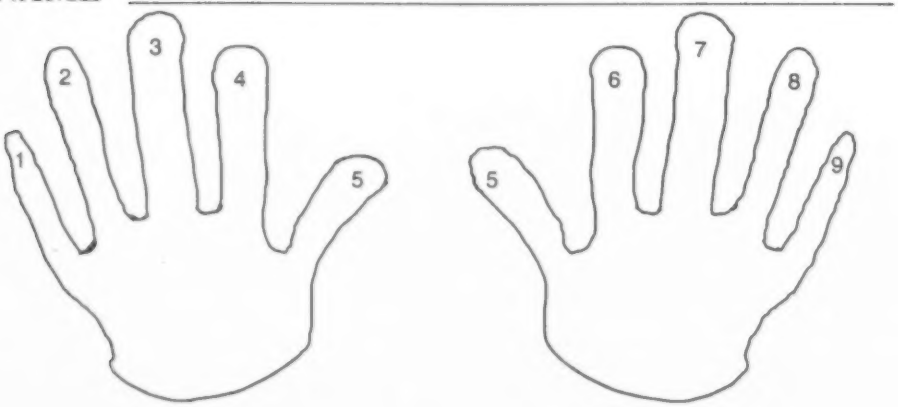


The lines indicate controlling home row reaches (e.g., the "j" finger controls the following keys: 6, 7, Y, U, H, N, M).

Student Worksheet #1

Student Worksheet #2

NAME _____



In the blank space before each number, place the number from the correct finger used in striking the following keys.

____ 1.	a	____12.	l	____23.	w
____ 2.	b	____13.	m	____24.	x
____ 3.	c	____14.	n	____25.	y
____ 4.	d	____15.	o	____26.	z
____ 5.	e	____16.	p	____27.	- (hyphen)
____ 6.	f	____17.	q	____28.	/ (diagonal)
____ 7.	g	____18.	r	____29.	, (comma)
____ 8.	h	____19.	s	____30.	; (semicolon)
____ 9.	i	____20.	t	____31.	: (colon)
____10.	j	____21.	u	____32.	. (period)
____11.	k	____22.	v	____33.	? (question mark)

APPENDIX D

Typing Test #1

If success is vital to you, you have a distinct advantage over many people who have no particular feeling one way or the other. The desire to succeed is helpful, for it causes us to establish goals without which our actions have little or no meaning. Success may not necessarily mean winning the big prize, but it does mean approaching a goal.

It is foolish, of course, to believe that we can all be whatever we wish to become. It is just as foolish, thoug¹ı, to wait around hoping for success to overtake us. We should analyze our aspirations, our abilities, and our limitations. We can next decide from various choices what we are best equipped with effort to become.

Typing Test #2

Few people have enough time to accomplish everything they desire. Those who appear to accomplish many of the things they attempt to do make choices regarding the most valuable uses of their time. They set up a series of major and minor goals and allocate their time to these goals on the basis of relative value in terms of time requirement.

First, determine exactly what it is you desire to have or to do. Next, analyze your behavior or actions to see whether they are helping or hindering your progress toward your objectives. On the basis of this self-analysis, devise a plan for time use that is unique to your own situation. Practice self-management until it becomes a habit.

Typing Test #3

You have learned a great many things since you began a keyboarding course. Not only have you built good operational technique with speed, you have also grown confident in using a machine with ease and control as you key a letter, report, table, or other document.

Although you have learned a lot, there is much yet for you to master. For example, you should learn to format additional letter and report styles because they are widely used in business. You can format simple tables; however, you have not attempted a complex one.

Just as speed and accuracy on straight copy are highly prized, so is the ability to process with efficiency a wide variety of documents that are used for both personal and business needs. Another term of directed practice will push you to higher skill in both areas.

Typing Test #4

Human relations skills on the job are very critical in terms of how you will be perceived by peers as well as by superiors. During your early weeks at work, you will be sized up quickly by co-workers. How they observe and evaluate you will help to determine whether your work experience will be pleasant, successful, and valuable.

Be cautious at first and do not align yourself closely with any of the cliques that often develop in the workplace. Show understanding and be courteous to everybody, but don't take sides in a dispute that may occur between members of any group of workers. Show that you can think for yourself, but don't convey your ideas too freely.

Look, listen, and learn before you take an active part in the politics of the workplace. Let the older, experienced workers be the agents of change. Study and learn from them and carefully notice what seems to cause their successes or failures. As you develop on a job, all positive human relations skills will be rewarded.

APPENDIX E

KNOX COUNTY SCHOOLS
ANDREW JOHNSON BUILDING

Dr. Charles Q. Lindsey, Superintendent

October 20, 1999

Mr. Steve Reagan
2906 Davis Ford Road
Maryville, Tennessee 37804

Dear Mr. Reagan:

You are granted permission to contact appropriate building-level administrators concerning the conduct of your proposed research study entitled, "Increasing Touch-Keyboarding Skills in the Middle School Student: *Key Words* versus *Type to Learn*, Hand Covers versus No Hand Covers." In the Knox County schools final approval of any research study is contingent upon acceptance by the principal(s) at the site(s) where the study will be conducted.

In all research studies names of individuals, groups, or schools may not appear in the text of the study unless *specific* permission has been granted through this office. The principal researcher is required to furnish this office with one copy of the completed research document.

Good luck with your study. Do not hesitate to contact me if you need further assistance or clarification.

Yours truly,

Samuel E. Bratton, Jr.

Samuel E. Bratton, Jr., Ed.D.
Coordinator of Research and Evaluation
Phone: (423) 594-1740
Fax: (423) 594-1709

Project No. 014

BEST COPY AVAILABLE

P.O. Box 2188 • 912 South Gay Street • Knoxville, Tennessee 37901-2188 • Telephone (423) 594-1800

Permission to Participate in a Study

I give permission for my child, _____ to participate in a research study conducted by Steve Reagan to learn the benefits of using different keyboarding software with or without hand covers to block the view of the keyboard during keyboarding practice. I understand that my child will not be identified in the research paper in any way. I understand that my child will be assigned at random to use one keyboarding program over the other.

_____ _____

Parent Signature Date